

many years and a chart (fig. 2) showing the average rainfall at that place is given in order that the amounts received at the two stations may be compared. Apia is situated on the north, or leeward, side of Upolu Island, the second largest island of the Samoan group.

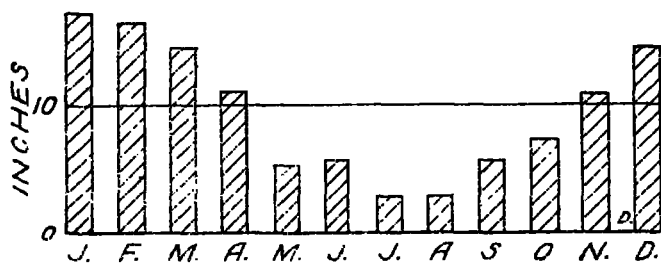


FIG. 2.—Rainfall at Apia, Samoa. Average monthly amounts.

Rainfall record, United States Naval Station, Pago Pago, Tutuila, 1900-1920.

[Inches.]

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1900.....	16.4	18.3	41.1	13.1	11.3	0.1	4.5	3.0	5.9	9.8	19.6	24.1	167.2
1901.....	21.5	29.0	17.1	9.4	15.1	3.5	10.4	6.2	21.6	21.2	18.4	3.9	177.3
1902.....	12.9	37.9	5.2	14.2	5.7	25.2	3.0	4.4	5.0	8.7	11.0	14.4	117.6
1903.....	21.9	24.9	12.7	26.9	12.1	12.5	16.6	11.2	10.3	19.9	20.4	10.8	199.3
1904.....	21.2	27.2	10.5	21.3	8.3	11.0	10.5	13.1	10.9	9.3	21.9	10.9	176.1
1905.....	21.8	12.1	15.5	16.0	3.5	10.3	7.5	10.6	1.7	8.7	12.3	10.1	130.1
1906.....	5.3	9.9	18.0	14.1	18.6	14.7	6.1	7.4	12.7	13.2	14.2	13.0	147.2
1907.....	19.2	21.2	11.3	26.1	13.1	32.0	12.5	5.0	11.1	23.7	29.0	17.9	222.1
1908.....	32.6	48.3	39.5	13.7	23.8	9.2	8.2	10.4	28.5	16.1	41.7	12.4	284.4
1909.....	16.1	15.1	11.6	13.8	15.5	9.8	3.6	3.6	8.1	11.8	19.9	16.2	145.1
1910.....	20.7	10.2	28.1	19.7	9.5	16.3	3.4	11.6	17.8	15.1	15.2	30.9	198.5
1911.....	18.8	30.2	19.3	11.7	12.3	5.2	5.2	2.3	5.0	12.3	9.4	18.1	149.8
1912.....	15.1	7.7	22.3	31.9	30.8	12.1	4.5	3.5	14.7	10.4	20.0	22.4	195.4
1913.....	27.7	44.7	17.8	25.5	60.5	12.5	21.8	5.4	17.2	18.6	7.5	16.0	275.2
1914.....	4.0	20.4	14.7	18.1	9.4	19.5	10.7	20.4	48.9	49.2	16.1	19.2	250.6
1915.....	37.5	7.9	17.6	10.7	1.7	4.5	16.4	0.6	10.0	10.1	8.7	30.6	156.3
1916.....	14.5	28.6	9.1	12.2	14.0	12.1	9.6	10.6	11.0	18.9	26.5	39.0	206.1
1917.....	38.3	34.6	34.0	22.2	5.4	20.7	7.5	5.8	7.8	19.5	29.8	24.3	249.9
1918.....	15.1	43.1	17.9	10.9	7.6	8.7	38.3	6.7	5.8	7.4	15.0	30.4	206.9
1919.....	49.8	22.6	16.5	8.4	14.8	9.6	2.0	4.7	11.3	3.9	16.9	14.4	174.9
1920.....	14.7	13.1	21.6	28.7	12.7	49.2	8.5	18.8	8.6	26.4	31.1	23.4	257.1
Average.....	21.2	24.2	19.1	17.5	14.6	14.2	10.0	7.9	13.0	15.9	19.3	19.2	196.1

—F. G. T.

CANADIAN WINTER WEATHER.

The following brief summary of weather conditions in Canada in October and November has been prepared by Sir Frederick Stupart, Director of the Canadian Meteorological Office, in response to a request from the EDITOR:

Reports from the Mackenzie River are not available.

Reports from the basins of the Athabaska and Slave Rivers and for the vicinity of Great Slave Lake may be summarized as follows:

October.—Although heavy frosts occurred occasionally in the districts of the upper Athabaska and along the shores of Great Slave Lake and frequently in other localities, the weather for the first four weeks was rather mild. A moderate cold wave spread into the region during the last few days of the month and ice started to form along the shores of the bays and inlets of Great Slave Lake.

November.—Moderately cold weather for the first few days was followed by a pronounced cold wave experienced in the northern districts from the 3d to 6th and in the south from 5th to 8th. During the cold dip minimum temperatures of zero or a few degrees below were registered in all localities reporting and the bays and inlets of Great Slave Lake were frozen over sufficiently for crossing by sleighs. The moderately cold weather following continued until the middle of the month when winter set in in earnest. Temperatures ranged from zero to 20 below during the last half of the month.

THE FORECASTING OF WINDS FOR AERIAL NAVIGATION.

Success in future aerial navigation will depend largely upon the forecasting of upper winds; but results to date have been surprisingly erroneous according to G. M. B. Dobson, in a paper presented before the Royal Meteorological Society (*Quarterly Journal Royal Meteorological Society*, October 1921, vol. 47, pp. 261-269). Investigating thoroughly, with forecasts based on the estimates of

future pressure gradients, he has found primarily the Daily Weather Report inaccurate to a marked degree, but with more copious charts the results obtained would be only slightly improved. The inability to forecast, first, the general pressure distribution, second, the irregularities of pressure around cyclones and anticyclones, third, the unsettled pressure distribution without specified high-or-low-pressure centers, are considered some of the causes for such poor results. But the principle cause, and the one apparently responsible for most of the errors, is the lack of knowledge concerning the small irregularities of pressure distribution around the centers of low pressure. If this knowledge could be obtained perfectly, forecasts of wind directions could be determined with much certainty although the velocities would still be doubtful.

Although much credit was given Mr. Dobson by the attendant members of the Society for such exactness in his report, still his paper was not without criticism from Col. E. Gold, Sir Napier Shaw, Mr. J. S. Dines, and others who vigorously defended the intrinsic value of the synoptic charts.

He (Mr. Dobson) stated with emphasis that in all his studies utility was distinctly omitted, his experiments being chiefly for academic purposes; but, congruous to the ideas of L. H. Richardson, he contended that prior to bringing errors in pressure gradient forecasting to a minimum, maps of greater detail are absolutely essential.

M. G. R.

RADIO WEATHER REPORTS ON THE PACIFIC COAST.

In order to better serve the marine and aviation interests operating in the coastal waters of the Pacific and the States bordering the Pacific coast, a new program of broadcasting weather information will be undertaken by the Weather Bureau in cooperation with the Navy Department, beginning March 15, 1922. In addition to major bulletins, issued at noon and 10:30 p. m., 75th meridian time, from the San Francisco Naval Radio Station, there will be local bulletins issued at various times of day from the Naval Radio Stations at Tatoosh Island, Wash., North Head, Wash., Eureka, Calif., San Pedro, Calif., Dutch Harbor, Alaska, and Honolulu, Hawaii. The major bulletins from the San Francisco station are divided into two parts, the first giving surface data at 8 a. m. and 8 p. m. (75th meridian time) and upper-air data for the afternoon of the date of distribution; the second part contains a synopsis of general conditions, barometer readings at centers of HIGHS and LOWS, wind and weather forecasts, and flying weather forecasts for the areas concerned. The local bulletins refer to weather forecasts and storm warning and local weather at the station. The six stations issuing local reports may be called upon by ships at any time for the latest warnings or forecasts. Complete information concerning the new service is contained in a bulletin issued by the Forecast Division of the Weather Bureau under date of March 1, 1922. A new base map of the regions concerned has been prepared, and will be furnished free to vessel masters who regularly take and forward weather observations to the Weather Bureau or the Navy Hydrographic Office; to others they will be available at 75 cents per hundred.

It is of interest to note that this new program extends to the Pacific coast a type of service that has been recently put in operation along the Atlantic and Gulf coasts and in the Caribbean Sea. With the establishment of this service, the entire coast of the United States and the waters adjacent thereto will enjoy an equally complete system of weather reports.—C. L. M.